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to 12 feet long containing apparently as much rock as could be drawn at two or three wagon-loads. Near each of these heaps is a quarry from which the rock forming the heap has been excavated. The quarry is from 1 to 3 feet deep, and usually 6 feet wide and 8 to 10 feet long.

No marks of tools have been discovered on the rocks; but in some places there are traces of fire. The quantity of rock quarried is great. It has been estimated that it would take 100 men six months to loosen the rock from its original position. Now if we remember that probably none but the rudest implements were used in the work, we will conclude that the time occupied was long. Beside the hill described there are at least four others, within a radius of three miles, covered with the same kind of ruins, and other hills with traces of the same peculiarities have been found in the state near Maple City.

Concerning the uses to which the rocks and edifices were put, we can only conjecture. There are at least five local theories advanced by the people in the vicinity, viz.: First, they are the sites of ancient mines. Second, the rocks were used as fortifications by warring tribes, and there is one tradition that the Spaniards were besieged here by the Indians. Third, they were residences. Fourth, they were used as places of religious ceremony. Fifth, they were places of burial.

The first four theories are hardly tenable for various causes: the fifth is possible. We may conjecture that tribes, camped between the bluffs in the valley below, near a large spring now known as Big Spring, buried their dead on the hilltops as do certain tribes to-day, notably the Osages, and as generation after generation died more rock was needed to erect more tombs, and in the course of time the great quantity which is now exposed was quarried. Human bones are said to have been found among the rocks, but this is not authentic.

Another theory, suggested by Dr. S. W. Williston, to whom this paper was shown, and which seems to the writer to be the most probable of all, is, that the ruins mark the sites of ancient flint quarries. The ledge on the top of the hill contains many flint nodules, sometimes nearly as large as a man's head, and among the loose rock these nodules are conspicuous for their absence, although many flakes of flint as large as one's hand may be found. This ledge is the furthest west of any flint-bearing ledge in the region; and probably the plains tribes from the west obtained their arrowheads and flint implements from this locality. This is further substantiated by the fact that the flint implements found in the prehistoric mounds at Arkansas City, some 20 miles northwest, contained fossil *Fusilina cylindrica*, which are characteristic of the flint mentioned. The edifices described above were probably temporary structures used by the workmen while engaged in quarrying. It is highly probable that systematic excavation would throw light on the subject.

PREHISTORIC MOUNDS IN COWLEY COUNTY.

By C. N. GOULD, Winfield, Kan. Read before the Academy January 1, 1897.

For several years a number of people in and around Arkansas City have known of the presence of some so-called Indian mounds east of the city; but, until recently, no attempt has been made at systematic excavation. The mounds, about a dozen in number, are situated on the bluffs east of the Walnut river, and about a hundred feet above the stream. Looking west, a good view is obtained of the city, the Walnut valley, and the range of bluffs to the north and west.

To the east the landscape, dotted here and there with farmhouses, stretches in gentle undulations until lost from view beyond the hills of Grouse creek.

Geologically, the mounds are situated on the highest massive limestone in the Permian of the region, probably referable to the *Pleurophorus* limestone of Prosser.

On December 21, 1896, a party composed of members of the Cowley County Historical Society drove from Winfield to the mounds for the purpose of making investigations. The investigations were confined to three mounds, and a number of valuable relics were found. The mounds, which have been greatly worn down, are circular in shape, from 20 to 30 feet in diameter, and from 2 to 5 feet high in the center. At the depth of from 1 to 3 feet from the surface, fragments of charcoal began to be found; these increase with the depth, until at from 4 to 10 feet deep, the soil is in a great measure replaced by charcoal and ashes. Intermingled with this charcoal are found broken pieces of pottery, apparently formed of broken shells mixed with clay and baked. No entire vessels have been found; but, judging from the fragments, they were shaped like a deep tin wash-basin, probably 6 inches deep and 10 to 12 inches in diameter. Several handles resembling those of a jug were found. The pottery is usually blackened with fire on one side, showing that it has been used.

Besides pottery were found a number of implements, including stone hammers and axes, mortars for grinding grain, flattened stones for dressing skins, flint arrow-heads and axes, and grooved stones, apparently for sharpening instruments, numerous flakes of flint, also two species of *Unio*, the bones of the following mammals: buffalo, elk, deer, rabbit, two species of mice, coyote, together with remains of tortoise, a gallinaceous bird, and fish.

Scattered over the mounds were a great quantity of Tertiary pebbles, which are not found nearer than the Arkansas river, three miles distant.

A few years since a cellar was dug on the site of one of these mounds, and a gentleman informed us that a half bushel of stone axes were thrown out in the loose dirt and carried away by people in the vicinity. It is to be regretted that these relics, which are of no little scientific value, should be lost by those who have so little appreciation of their importance.

BARITE NODULES IN WOOD.

By E. B. KNERR, Atchison, Kan. Read before the Academy December 31, 1896.

In digging a well during the summer of 1896 near Midland College, the workmen brought up some bits of wood from a depth of 40 feet. A peculiarity in the wood was the presence of many little white spheres, ranging from a thirty-second to an eighth of an inch in diameter. The material was crystalline in structure, the crystals radiating from the centers of the spheres, and chemical analysis proved it to be barite. The appearance of the wood fibers is as if they had been formed around the spheres. Whatever was the occasion of the peculiar growth, evidently the barite was a subsequent deposit in the cavities.

A careful separation of the material, to get it as pure as possible, gave the following analysis:

SiO ₂ and gangue.....	4.00	per cent.
SO ₃	33.25	"
BaO.....	62.17	"
CaO.....	.50	"
Total.....	99.92	per cent.